

# Free statistics for managers case study example

[Art & Culture](#), [Symbolism](#)



9. 1 You use the symbol  $H_0$  for which hypothesis?

### **Null hypothesis**

9. 2 You use the symbol  $H_1$  for which hypothesis?

### **Alternative hypothesis**

9. 3 What symbol do you use for the chance of committing a Type I error?

9. 4 What symbol do you use for the chance of committing a Type II error?

$\beta$

9. 5 What does  $1 - \alpha$  represent?

confidence level

9. 6 What is the relationship of  $\alpha$  to a Type I error?

it is the significant level

9. 7 What is the relationship of  $\beta$  to a Type II error?

### **If the null hypothesis is false, then the probability of a Type II error is called $\beta$**

9. 8 How is power related to the probability of making a Type II error?

### **When the power is decreased, then the chances of you making an error is decreased**

9. 9 Why is it possible to reject the null hypothesis when it is true?

### **When the sample evidence suggests that it is far more likely that the alternative**

hypothesis is true.

9. 10 Why is it possible to not reject the null hypothesis when it is false?

## **When the alternative hypothesis has not been proven**

9. 11 For a given sample size, if  $\alpha$  is reduced from 0. 05 to 0. 01, what happens to  $\beta$ ?

## **Then you are going to be a lot more likely to have a Type II error**

9. 75 What is the difference between a null hypothesis,  $H_0$ , and an alternative hypothesis,  $H_1$ ?

The difference between the null and the alternative hypothesis statements in one-tailed and two-tailed tests is when to reject the hypothesis.

9. 76 What is the difference between a Type I error and a Type II error?

A type I error occurs when the results of research show that a difference exists but in truth there is no difference; so, the null hypothesis  $H_0$  is wrongly rejected when it is true. A type II error occurs when the null hypothesis is accepted, but the alternative is true; that is, the null hypothesis, is not rejected when it is false.

9. 77 What is meant by the power of a test?

the probability that we can the reject null hypothesis at a given mean that is away from the one specified in the null hypothesis

9. 78 What is the difference between a one-tail test and a two-tail test?

For a one-tailed test, the hypothesis is rejected if one side has extreme values. For a two-tailed test, both sides need to have extreme values.

9. 79 What is meant by a p-value?

the probability of observing a test statistic that is as extreme or more extreme than currently observed assuming that the null hypothesis is true.

9. 83 An article in Marketing News (T. T. Semon, Consider a Statistical

Insignificance Test, Marketing News, February 1, 1999) argued that the level of significance used when comparing two products is often too low that is, sometimes you should be using an  $\alpha$  value greater than 0.05. Specifically, the article recounted testing the proportion of potential customers with a preference for product 1 over product 2. The null hypothesis was that the population proportion of potential customers preferring product 1 was 0.50, and the alternative hypothesis was that it was not equal to 0.50. The p-value for the test was 0.22. The article suggested that in some cases, this should be enough evidence to reject the null hypothesis.

a. State the null and alternative hypotheses for this example in statistical terms.

null hypotheses - 0.50

alternative hypotheses - 0.25

b. Explain the risks associated with Type I and Type II errors in this case.

**Since the hypotheses are so low, then there is not a big risk of errors in this case**

c. What would be the consequences if you rejected the null hypothesis for a p-value of 0.22?

**There is a 22% chance that you are going to get an incorrect answer**

d. Why do you think the article suggested raising the value of  $\alpha$ ?

e. What would you do in this situation?

I would have done exactly what the company need in this situation. The value should have been raised.

f. What is your answer in (e) if the p-value equals 0.12? What if it equals 0.06?

### **References:**

Statistics for Managers Using Microsoft Excel, Fifth Edition, by David M.

Levine, Mark L.

Berenson, and Timothy C. Krehbiel. Published by Prentice Hall.